IN THE CLAIMS

Please amend claims 1, 10, and 19, and add new claims 20-27 as follows:

1. (CURRENTLY AMENDED) A method of optimizing a system for transmitting a layered modulated signal, comprising the steps of:

defining the system in terms of a set of system parameters, including an optimal power separation S between a power of a first modulation layer and a power of a second modulation layer and a required system carrier-to-noise ratio (CNR_S);

determining an optimal power separation S to minimize [[the]] <u>an</u> error rate of a lower layer modulated signal BER_L; and

selecting [[the]] remaining system parameters in the set of system parameters using the determined optimal power separation S.

2. (ORIGINAL) The method of claim 1, wherein:

the layered modulation signal comprises an upper layer signal and a lower layer signal, and

the step of selecting the remaining system parameters using the determined optimal power separation P_x comprises the steps of:

determining a required CNR for the upper layer (CNR_U) and a required CNR for the lower layer (CNR_L) from a relationship between an upper layer coding rate C_{UL} and CNR_U, and a lower level coding rate C_{LL} and CNR_L; and

determining a required system CNR (CNR_x) from CNR_U, CNR_L, and S.

3. (ORIGINAL) The method of claim 2, wherein the required CNR_s is determined at least in part from the relations:

$$CNR_U = 10\log_{10}\frac{10^{(CNR_S+S)/10}}{1+10^{S/10}+10^{CNR_S/10}}\text{; and}$$

$$CNR_L = 10\log_{10}\frac{10^{CNR_S}}{1+10^{S/10}},$$ wherein (CNR_s) from CNR_U, CNR_L, and S are expressed in decibels.

4. (ORIGINAL) The method of claim 2, wherein $C_{UL} = C_{LL}$.

5. (ORIGINAL) The method of claim 2, wherein $C_{UL} \neq C_{LL}$ and wherein the step of determining a required system CNR (CNR_s) from CNR_U, CNR_L, and P_x, comprises the steps of:

selecting a value for CNR_U and a value for CNR_L; and

determining the required CNR_s from a relationship between CNR_s and CNR_U, CNR_L, and S.

6. (ORIGINAL) The method of claim 5, wherein the required CNR_s is determined at least in part from the relation:

$$10\log_{10}\frac{10^{(CNR_S+S)/10}}{1+10^{S/10}+10^{CNR_S/10}} = 10\log_{10}\frac{10^{CNR_S/10}}{1+10^{S/10}}.$$

7. (ORIGINAL) The method of claim 1, wherein the error rate of a upper layer modulated signal $BER_U = \gamma BER_L$, wherein $\gamma < 1$, and wherein:

the method further comprises the step of determining an upper layer CNR compensation β required to produce an upper layer modulated signal error rate BER_U defined at least in part by the relationship $CNR_U^{*} = CNR_U + \beta$; and

the step of selecting the remaining system parameters using the determined optimal power separation S comprises the steps of:

determining the required system CNR, CNR_s, at least in part from the determined optimal power separation, S, and a relation

$$10\log_{10}\frac{10^{(CNR_S+S)/10}}{1+10^{S/10}+10^{CNR_S/10}} = 10\log_{10}\frac{10^{CNR_S/10}}{1+10^{S/10}}+\beta .$$

8. (ORIGINAL) The method of claim 7, wherein the upper layer CNR compensation β is determined at least in part from a relationship between β and parameters including CNR_U and γ.

9. (ORIGINAL) The method of claim 8, wherein β is determined at least in part from a relationship between β and parameters further including C_{UL}.

10. (CURRENTLY AMENDED) An apparatus for optimizing a system for transmitting a layered modulated signal, comprising:

means for defining the system in terms of system parameters, including an optimal power separation S between a power of a first modulation layer and a power of a second modulation layer and a required system carrier-to-noise ratio (CNR_S);

means for determining an optimal power separation S to minimize [[the]] <u>an</u> error rate of a lower layer modulated signal BER_L; and

means for selecting [[the]] remaining system parameters using the determined optimal power separation S.

11. (ORIGINAL) The apparatus of claim 10, wherein:

the layered modulation signal comprises an upper layer signal and a lower layer signal, and

the means for selecting the remaining system parameters using the determined optimal power separation P_x comprises:

means for determining a required CNR for the upper layer (CNR_U) and a required CNR for the lower layer (CNR_L) from a relationship between an upper layer coding rate C_{UL} and CNR_U, and a lower level coding rate C_{LL} and CNR_L; and

means for determining a required system CNR (CNR_s) from CNR_U, CNR_L, and S.

12. (ORIGINAL) The apparatus of claim 11, wherein the required CNR_s is determined at least in part from the relations:

$$CNR_U = 10\log_{10}\frac{10^{(CNR_S+S)/10}}{1+10^{S/10}+10^{CNR_S/10}}; \text{ and}$$

$$CNR_L = 10\log_{10}\frac{10^{CNR_S/10}}{1+10^{S/10}},$$ wherein (CNR_s) from CNR_U, CNR_L, and S are expressed in decibels.

13. (ORIGINAL) The apparatus of claim 11, wherein $C_{UL} = C_{LL}$.

14. (ORIGINAL) The apparatus of claim 11, wherein $C_{UL} \neq C_{LL}$ and wherein the means for determining a required system CNR (CNR_s) from CNR_U, CNR_L, and P_x, comprises:

means for selecting a value for CNR_U and a value for CNR_L; and

means for determining the required CNR_s from a relationship between CNR_s and CNR_U, CNR_L, and S.

15. (ORIGINAL) The apparatus of claim 11, wherein the required CNR_s is determined at least in part from the relation:

$$10\log_{10}\frac{10^{(CNR_S+S)/10}}{1+10^{S/10}+10^{CNR_S/10}} = 10\log_{10}\frac{10^{CNR_S/10}}{1+10^{S/10}}.$$

16. (ORIGINAL) The apparatus of claim 10, wherein the error rate of a upper layer modulated signal $BER_U = \gamma BER_L$, wherein $\gamma < 1$, and wherein:

the apparatus further comprises means for determining an upper layer CNR compensation β required to produce an upper layer modulated signal error rate BER_U defined at least in part by the relationship $CNR_U^* = CNR_U + \beta$; and

the means for selecting the remaining system parameters using the determined optimal power separation S comprises:

means for determining the required system CNR, CNR_s, at least in part from the determined optimal power separation, S, and a relation

$$10\log_{10}\frac{10^{(CNR_S+S)/10}}{1+10^{S/10}+10^{CNR_S/10}} = 10\log_{10}\frac{10^{CNR_S/10}}{1+10^{S/10}} + \beta .$$

17. (ORIGINAL) The apparatus of claim 7, wherein the upper layer CNR compensation β is determined at least in part from a relationship between β and parameters including CNR_U and γ.

18. (ORIGINAL) The apparatus of claim 8, wherein β is determined at least in part from a relationship between β and parameters further including C_{UL}.

19. (CURRENTLY AMENDED) [[An]] A system for transmitting a layered modulation signal characterized by a CNR of CNR_s having an upper layer signal characterized and a lower layer signal, wherein a power of the upper layer signal is separated by a power of the lower layer signal by a power separation S, the apparatus defined by performing the steps of:

defining the system in terms of a set of system parameters, including an optimal power separation S between a power of a first modulation layer and a power of a second modulation layer and a required system carrier-to-noise ratio (CNR_S);

determining an optimal power separation S to minimize [[the]] an error rate of a lower layer modulated signal BER_L; and

selecting [[the]] remaining system parameters in the set of system parameters using the determined optimal power separation S.

20. (NEW) The system of claim 19, wherein:

the layered modulation signal comprises an upper layer signal and a lower layer signal, and

the step of selecting the remaining system parameters using the determined optimal power separation P_x comprises the steps of:

determining a required CNR for the upper layer (CNR_U) and a required CNR for the lower layer (CNR_L) from a relationship between an upper layer coding rate C_{UL} and CNR_U, and a lower level coding rate C_{LL} and CNR_L; and

determining a required system CNR (CNR_s) from CNR_U, CNR_L, and S.

21. (NEW) The system of claim 20, wherein the required CNR_s is determined at least in part from the relations:

$$CNR_U = 10\log_{10}\frac{10^{(CNR_S+S)/10}}{1+10^{S/10}+10^{CNR_S/10}}; \text{ and}$$

$$CNR_L = 10\log_{10}\frac{10^{CNR_S}}{1+10^{S/10}},$$ wherein (CNR_s) from CNR_U, CNR_L, and S are expressed in decibels.

22. (NEW) The system of claim 20, wherein $C_{UL} = C_{LL}$.

23. (NEW) The system of claim 20, wherein $C_{UL} \neq C_{LL}$ and wherein the step of determining a required system CNR (CNR_s) from CNR_U, CNR_L, and P_x, comprises the steps of:

selecting a value for CNR_U and a value for CNR_L; and

determining the required CNR_s from a relationship between CNR_s and CNR_U, CNR_L, and S.

24. (NEW) The system of claim 23, wherein the required CNR_s is determined at least in part from the relation:

$$10\log_{10}\frac{10^{(CNR_S+S)/10}}{1+10^{S/10}+10^{CNR_S/10}} = 10\log_{10}\frac{10^{CNR_S/10}}{1+10^{S/10}}.$$

25. (NEW) The system of claim 19, wherein the error rate of a upper layer modulated signal $BER_U = \gamma BER_L$, wherein $\gamma < 1$, and wherein:

the apparatus is defined by performing a further step comprising the step of determining an upper layer CNR compensation β required to produce an upper layer modulated signal error rate BER_U defined at least in part by the relationship $CNR_U^* = CNR_U + \beta$; and

the step of selecting the remaining system parameters using the determined optimal power separation S comprises the steps of:

determining the required system CNR, CNR_s, at least in part from the determined optimal power separation, S, and a relation

$$10\log_{10}\frac{10^{(CNR_S+S)/10}}{1+10^{S/10}+10^{CNR_S/10}} = 10\log_{10}\frac{10^{CNR_S/10}}{1+10^{S/10}} + \beta .$$

26. (NEW) The system of claim 25, wherein the upper layer CNR compensation β is determined at least in part from a relationship between β and parameters including CNR_U and γ.

27. (NEW) The system of claim 26, wherein β is determined at least in part from a relationship between β and parameters further including C_{UL}.